REMARKS

By the present amendment, claim 7 has been amended to recite that the step of transferring heat, at steady state, transfers at least about 0.6 W/cc of total reactor volume. Support for this amendment is found in the original application, for example in original claim 1.

Also, claim 14 has been rewritten in independent form by incorporating therein the subject matter of claim 1, claims 28 and 32 have been amended by incorporating therein the subject matter of claim 6, claim 33 has been amended by incorporating therein the subject matter of claim 7, and claim 45 has been rewritten in independent form by incorporating therein the subject matter of claims 11, 38 and 39. In addition, claims 22-23 have been canceled and new claims 47 and 48 incorporating the subject matter of claims 1 and 24 and 11 and 45, respectively, have been added.

Since claims 14-17, 24, 27-35, 37 and 45 were indicated in the Office Action to contain allowable subject matter, it is submitted that these claims as amended herein are immediately allowable. Further, since it was indicated in the Office Action that "the prior art does not disclose a contact time of less than 0.01 seconds," it is submitted that claims 47-48 are also immediately allowable.

Claims 1, 5-9, 11-21 and 24-48 are pending in the present application.

In the Office Action, claim 6 is rejected under 35 U.S.C. 102(a) as anticipated by U.S. Patent No. 5,725,756 to Subramaniam et al. (Subramaniam), claims 1, 5, 7, 11-12, 18-21, and 25-26 are rejected under 35 U.S.C. 103(a) as obvious over Subramaniam in view of U.S. Patent No. 3,145,238 to Kestner (Kestner) and U.S. Patent No. 4,985,230 to Baden et al. (Baden), claims 8-9 are rejected under 35 U.S.C. 103(a) as obvious over Subramaniam in view of Kestner and Baden, and further in view of WO 90/07377 to Eri et al. (Eri), claims 13, 22-23, 36 and 44 are rejected under 35 U.S.C. 103(a) as obvious over Subramaniam in view of Kestner and Baden, and further in view of U.S. Patent No. 4,065,379 to Soonawala et al. (Soonawala), and claims 38-44 are rejected under 35 U.S.C. 103(a) as obvious over Subramaniam in view of Kestner and Baden, and further in view of Pestryakov et al., React. Kinet. Catal. Lett., Vol. 53, No. 2, 347-352 (1994) (Pestryakov).

It is alleged in the Office Action that Subramaniam discloses that the reaction mixture has

B

"a fluid density of greater than 0.65 gm/cc" and that "a volume of at least 0.65 g/cc maximizes the reaction rates and minimizes deactivation rates and coke laydown rates... or preferably greater than 0.5 g/cc," and further, that Kestner discloses a residence time of 0.1 to 0.4 sec. and a pressure of 1 to 10 psig, Baden discloses a low pressure drop to reduce power requirements, Eri discloses reducing a side reaction of methane, Soonawala discloses a contact time of 0.04 to 1.0 sec and multiple stage operations, and Pestryakov discloses an intermediate layer on foam metal for deep catalytic oxidation reactions.

The rejections are respectfully traversed. It is submitted that Subramaniam completely fails to teach or suggest selecting a range of heat transfer in the order of at least 0.6 W of heat per cc of total reactor volume as recited in claims 1, 6, 7, and 11.

Specifically, Subramaniam does not discuss heat transfer. The Office Action refers to the disclosure of a fluid density greater than 0.65 g/cc in Subramaniam (col. 11, line 19 and abtract), but Subramaniam selects fluid density in view of the critical state of the fluid mixture, which does not necessarily relate to heat transfer. Further, in the only experimental example, Subramaniam discloses 1-hexene reforming using a 10cc reactor and fuel stock feeding rate of 135 g/g cat./hr. Assuming a 1-hexene conversion rate of 100% and 100% product selectivity towards 2,3-dimethyl-2-butene (isomerization route which results in the highest exothermicity), the heat flux is thus calculated to be 0.124 W/cc, which is considerably lower than 0.6 W/cc. The actual heat transfer rate which can be practically obtained with the process of Subramaniam is even lower than the calculated value of 0.124 W/cc.

Further, since Subramaniam focuses on optimizing the reaction temperature and pressure (see, e.g., col. 3, lines 30-31), Subramaniam does not provide any other suggestion or motivation to improve the heat transfer amounts. The other cited references fail to remedy this deficiency of Subramaniam. For example, the heat transfer rates in Baden (heat transfer coefficient h of 117 to 230 kcal/m^{2}hr°C in 55x300x1000mm reaction chamber) are several orders lower than 0.6 W/cc, as discussed in the response to the previous Office Action.

In contrast, in the present invention as claimed in the present claims, i.e., claims 1, 6, 7, and 11, and the claims dependent thereon, the process is conducted so as to ensure a heat transfer of at

B

least 0.6 W/cc, as recited in these claims. An advantage of this feature is that the catalyst can be maintained in a temperature range that reduces or eliminates the formation of undesirable by-products. This feature of the present claims is not taught or suggested in Subramaniam, and the other cited references fail to remedy this deficiency of Subramaniam. Therefore, the present claims are not anticipated, and not obvious over, Subramaniam or any of the cited combinations of references including Subramaniam.

In view of the above, it is submitted that the rejections should be withdrawn.

CLOSURE

Applicant has made an earnest attempt to place the above referenced application in condition for allowance and action toward that end is respectfully requested.

If the Examiner has any questions or would like to speak to Applicants' representative, the Examiner is encouraged to call Applicants' attorney at the number provided below.

Respectfully submitted,

Date: 28 Oct. 2002

By: Frank Rosenberg

send correspondence to:
Stephen R. May
Intellectual Property Services
Battelle Memorial Institute
Pacific Northwest Division
Post Office Box 999
Richland, Washington 99352
(509) 375-2387

Frank Rosenberg
Registration No. 37,068
tel: (925) 376-8416

C:\DOCUME~1\FRANK\LOCALS~1\TEMPOR~1\OLK9\E1666B~1.WPD

B